

it provides vast feeding grounds for shore birds, although, in the absence of cliffs, rock-breeding species are scarce or absent. Dumfriesshire has been re-afforested to a wide extent since the earlier parts of the last century. Consequently suitable habitats have been provided for many species which would not otherwise be included in its register, while "hedge enclosures with rows, belts, or clumps of ornamental or 'wind-breaking' trees have greatly encouraged the increase of passerine birds." The firth opens its arms also to welcome home-coming immigrants and birds of passage. "There is no doubt," as Mr. Gladstone remarks, "that in comparatively recent geologic times the Irish Channel was a great tidal river, of which the Solway streams were its northernmost tributaries, and that this ancient river valley was the route by which the birds went and came in long by-past ages—a route which has left so strong an impression on posterity that the birds travel along what is now a broad sea-way."

The number of species recorded from Dumfries is of residents, 70; summer visitants, 31; winter visitants, 31; occasional visitors, 30; very rare or accidental visitors, 56; or, in all, 218. One reads with regret that eagles and harriers have ceased to nest; that martins, barn-owls, and swallows are scarcer; but, on the other hand, it is pleasant to know that pied flycatchers, tufted ducks, great spotted woodpeckers, jays, woodcock, and peregrine falcons have become more numerous. The author's biographies—all of them just what they should be—of the different species, abound with interesting observations. In speaking of the dipper, by the way, Mr. Gladstone records that there has been a nest in a certain stream for 123 years in succession. There are a score of heronries in the county, and the list of rookeries is a long one, the site of some of them dating back for more than 600 years. Notwithstanding that 36,000 rooks have been killed in the last three years, the stock shows few signs of decimation. Incursions of sandgrouse and of continental crossbills are recorded, the latter species nesting apparently only for a few seasons after such visitations.

We commend heartily "The Birds of Dumfriesshire" to all British ornithologists, and especially to those north of the Solway. The volume is provided with what is too often forgotten in faunistic books, an excellent map, and, with a good index, a *sine qua non* of a book of reference, if it is to be fully useful. By the courtesy of the publishers we are able to exemplify its illustrations by a specimen of the twenty-four full-page pictures which adorn it.

NOTES.

ON Monday next, January 23, an important development in Oceanographical Science will take place by the inauguration of the Oceanographical Institute in Paris, which has been founded and endowed by the Prince of Monaco. In NATURE of April 14 and November 3, 1910, notices appeared of the opening of the Oceanographical Museum founded by the Prince at Monaco, and a description of the museum and its objects was given by Mr. J. Y. Buchanan. With the opening of the Institute next week, a further development will take place; for the Institute will now be composed of, first, the Institute at Paris; secondly, the Museum at Monaco. The Prince has described the Museum at Monaco as the workshop, and the Institute in Paris as the retail house. The Institute is French and international—French because its seat is in Paris, directed by a French administrative committee consisting of M. Emile Loubet, M. W. Darboux, M. Caillietet, Dr. P. Regnard, Mr. Georges Kohn, and Mr. Louis Mayer; international

because the scientific and technical direction is in the hands of what is termed the "Comité de Perfectionnement," of which the president is the Prince of Monaco, and the vice-president Mr. J. Y. Buchanan, while the other British members are Sir John Murray, K.C.B., and Dr. W. S. Bruce. The committee also includes the names of many eminent French, German, Scandinavian, and other oceanographers. While the Museum is under the direction of Dr. Jules Richard, the Institute in Paris is under the administration of Dr. P. Regnard. Three professors are connected with the Institute—M. Joubin for biological oceanography, M. Berget for physical oceanography, and M. Portier for the physiology of marine creatures. After the opening of the Institute on January 23 the Comité de Perfectionnement will meet, and future arrangements for the development of the Institute will be duly considered.

SIR DAVID GILL, K.C.B., F.R.S., has been elected a foreign member of the Swedish Royal Academy of Sciences, Stockholm.

A REUTER message from St. Petersburg announces that the Russian Academy of Sciences has conferred honorary membership on Prince Albert of Monaco, and has elected the following as corresponding members:—Mr. Bryce, British Ambassador to the United States; Prof. Lorentz, Leyden; Prof. Strasburger, Bonn; and Prof. Lewes, Albany.

At the meeting of the Paris Academy of Sciences on January 3, the incoming president, M. Armand Gautier, comparing the practice of the Academy with that of the Royal Society, mentioned the fact that during the half-hour preceding the formal opening of each meeting of the latter, the fellows meet in the ante-room for informal conversation, and he expressed the hope that a similar arrangement could be organised for the Academy. This would avoid the necessity for private conversations being carried on during the actual meeting.

It is reported from Sydney that the Science Congress—which, we suppose, is the Australasian Association for the Advancement of Science—has voted 1000*l.* for Dr. Mawson's Australian Antarctic expedition, which is starting in November for the purpose of exploring the regions between Cape Adare and the Kaiser Wilhelm II. Land. Three Australian citizens are each contributing 1000*l.* to the expedition, and other generous help has been promised.

THE report referred to in a paragraph last week (p. 342), that the town of Prjevalsk in Turkestan was destroyed by waves of the Issil-Kul Lake during the Vyernyi earthquake of January 3-4, proves to have been incorrect. The towns along the northern shore of the lake, however, suffered severely, and fifty persons were killed. It will be noticed that the position of the epicentre as given in Dr. W. N. Shaw's letter (p. 335) is in the immediate neighbourhood of the lake.

ACCORDING to a Press message from Winnipeg, information has reached there from Fort Churchill, on Hudson's Bay, that the schooner *Jeanie*, with fifteen geological surveyors on board, was wrecked on September 9, 1910, in a gale near Wagner inlet. After suffering great hardships the party reached Fort Churchill on December 1, and is now on its way to Winnipeg by dog train. The party left Ottawa last spring to investigate the flora and fauna in the Hudson's Bay district.

A REUTER message from Washington states that the members of the U.S. Geodetic Survey who have been examining Commander Peary's Arctic observations

declared, during the hearing of his request for retirement from the Navy, that the explorer went within sixteen to ten miles of the North Pole. It is also announced from Washington that the House Committee on Naval Affairs has reported favourably on the Bill retiring Commander Peary with the rank of Rear-Admiral "on account of his Polar attainment."

A REUTER message from Berlin states that, under the presidency of the Minister of Public Worship, a meeting was held there on January 11 to draw up a foundation scheme for the Emperor William Society for the Encouragement of Science. According to the resolutions adopted, membership will entail an entrance fee of 1000l. and a yearly subscription of 50l. The society will be governed by a general assembly, a senate, and an executive committee. The senate will consist of ten members elected by the society, but the power to appoint additional senators is reserved by the Emperor, as protector.

WE learn from the *Revue scientifique* that the French Budget for 1911 provides various grants to learned societies in France. Among these may be mentioned 1400 francs to the mathematical society; 1000 francs each to the societies of anthropology, zoology, biology, and botany, the prehistoric society, the Bordeaux society of sciences, and the Rennes society of sciences; 600 francs to each of the societies of meteorology, mineralogy, and the Nantes society of sciences. Grants of 500 francs are made to three societies, of 400 francs to three societies, and 240 francs to one society. A grant of 25,000 francs is included for the fund available to assist scientific research.

THE director of the Meteorologica! Office announces that the series of meetings commenced in 1905 for the informal discussion of important contributions to meteorological literature, particularly those by colonial and foreign meteorologists, will be continued this year. The meetings will be held on the following Mondays, at 5 p.m.:—January 23, February 6 and 20, March 6 and 20. At the opening meeting on Monday next, Prof. Grossmann will open a discussion on the relation between the temperatures of the North Atlantic Ocean, and of North-West and Central Europe. The subjects suggested for discussion at subsequent meetings are as follows:—*Meteorologische Optik*, J. M. Pernter; *Cloud Report*, Part ii., H. H. Hildebrandsson; scientific results of the *Scotia*, 1902–4, R. C. Mossman; *Einfluss des Windes auf die Fahrt von Dampfern*, P. Heidke; on the influence of the earth's rotation on ocean currents, W. Ekman; on the influence of forests on rainfall and the probable effect of *déboisement* in agriculture in Mauritius, A. Walter; climatological diagrams, John Ball; on the double diurnal variations of the velocity of the wind at Nagasaki, Y. Tsuiji; the amount of radium emanation in the atmosphere, J. Satterly.

A CIRCULAR letter has been issued by the British Executive Committee of the International Hygiene Exhibition, to be held in Dresden this year, directing attention to the fact that the British Government has declined the invitation to participate in the exhibition. All the chief States of the world, with the single exception of Great Britain, have accepted the invitation, and have voted substantial sums in aid thereof. The British committee is therefore appealing for 10,000l., which is necessary if Britain is to be represented at the exhibition. Contributions, or promises thereof, should be sent immediately to the secretary, 47, Victoria Street, S.W.

In a letter to the *Times*, January 11, the chairman (the Bishop of Ripon) and the executive committee of the National League for Physical Education and Improvement

direct attention to three leaflets issued by the league dealing with the question of a pure milk supply. These have been prepared by Sir John McFadyean, Prof. Simpson, Mr. F. E. Freemantle, and Dr. J. F. Sykes. One leaflet, intended for "farmers and other milk producers," contains advice upon the care of cows, the precautions to be observed by the milkers, the treatment of the cowsheds, the cleansing of utensils, storage, and the danger of human infection. In a second leaflet, "distributors and retailers" are informed of the steps which they should take with regard to dairies and milk shops, infection, contamination, and souring, storage, and sale, utensils, and cleanliness during delivery. The third leaflet contains a number of hints for the benefit of "housewives and all consumers of milk."

AN interesting observation, dealing with a very obscure phenomenon of alcoholic fermentation, was communicated at a meeting of the Institute of Brewing on January 9 by Mr. O. Overbeck. In endeavouring to prepare a non-alcoholic beer by removing the alcohol from ordinary beer by a stream of carbon dioxide, Mr. Overbeck states that he found that the beer after this treatment recovered a part of its alcohol content when cooled and aerated with carbon dioxide. Thus, beers which after the removal of alcohol contained only 0.2 per cent. of this substance were found after treatment with carbon dioxide in the cold to contain as much as 1 to 1.5 and even 2 per cent. As the liquids were in all cases practically free from yeast, this remarkable production of alcohol cannot easily be explained in the light of our present knowledge. It may be due to some purely chemical effect or to the presence of some unsuspected ferment in the beer, the action of which becomes noticeable under the conditions of the experiment. Confirmation of the observations and further experiments on the nature of the phenomenon will be awaited with great interest.

THE scientific career of Col. George Strahan, who died last week at seventy-one years of age, is described in *The Times* of January 16, as follows: "After serving for a short time in the Irrigation Branch of the Public Works Department in India he was appointed to the Survey Department, in which he continued for the rest of his service. The early portion of his survey career was passed in the Topographical Branch, and many thousand square miles of country in Rajputana and Mysore, as well as in other parts, were surveyed by him and the officers under him. In later years he was employed in the electric determination of longitudes in India and between India and Greenwich, for which work he was specially suited. He rose to be Superintendent of the Great Trigonometrical Survey, and also acted for a short time as Surveyor-General."

TIME was when the expression "the tsetse-fly" was understood to mean simply the species *Glossina morsitans*, Westwood. Indeed, the name is still often used in this sense by many writers; not long ago Prof. Kleine created a sensation in the daily Press by the statement that "the tsetse" did not transmit sleeping sickness, meaning, thereby, *G. morsitans*, but producing the mistaken impression that he had proved *G. palpalis* to be innocent in the matter of spreading the disease. One newspaper even went so far as to state that Kleine had disproved any connection between *G. palpalis* and sleeping sickness. Austen, in his standard monograph of the genus *Glossina*, recognised seven species of tsetse, and acknowledged, subsequently, the validity of an eighth, *G. tachinoides*, Westw. In a paper noticed recently in *NATURE* (December 29, 1910, p. 279), Mr. Newstead brings the number of

species up to eleven, and proposes to distribute them amongst three distinct genera. The problems involved are by no means of purely academic interest, but have the utmost practical importance from the known fact that different species of tsetse flies are instrumental in transmitting the different species of trypanosomes that produce diseases in man and animals, and it is a matter of urgent necessity to determine exactly the various species of these flies and the limits of their distribution.

In its issue of January 6, the *Times* announces the grant by the Treasury of 40,000l. to the Board of Agriculture and Fisheries for the encouragement of light horse breeding in Great Britain. In administering the grant, the Board will have the assistance of a special Advisory Council. The purposes of the grant are five in number, namely:—(1) the award of premiums to stallions; (2) awards for the purchase of half-bred working broodmares for location in specified districts; (3) free nominations for suitable mares for service by premium or approved stallions; (4) the purchase—for re-sale—of stallions; (5) the voluntary registration of stallions. The awards to stallions will be of two classes, viz. King's premiums and the Board's premiums, the former to be given to stallions at the ensuing spring show in London, and the latter to animals exhibited at other spring shows or selected by the Board. In an article on the grant in the *Daily Telegraph* of January 11, it is stated that certain authorities consider that it will increase the supply of hunters, cobs, &c., and ask what means are provided to create a demand for this increased stock. Owing to the steady development of motor traction, the demand for light horses is not increasing, and will probably become still smaller, so that unless the War Office is prepared to increase largely its purchases, it is difficult to see where breeders are to find a market.

PART IX. of the fifth volume of the *Annals of the South African Museum* is devoted to a revised list of the local reptiles and amphibians, with descriptions of new species, by Mr. G. A. Boulenger. In connection with this may be mentioned a list of East African reptiles and amphibians, by Mr. S. E. Meek, published by the Field Museum at Chicago (Zool. Ser., vol. vii., No. 11), based on a collection made from 1905 to 1907.

According to the *Egyptian Morning News* of December 20, 1910, Captain Stanley Flower has been unusually successful in his eleventh collecting trip to the Sudan, from which he returned with no fewer than 170 live animals for the zoological gardens at Giza, together with a number of museum specimens. The rarities include a Sudani galago (*Galago teng*), a white-tailed mongoose in which the whole tail is (abnormally) black, and a cow buffalo from the Blue Nile, the last-mentioned race being already represented in the gardens by a bull.

In our own Zoological Gardens it is intended to display a special exhibition of African animals during the coming summer. Some out of a series of birds collected for the King were received at the gardens a few months ago, and it is announced in the *Field* of January 7 that half a dozen mammals brought home by H.R.H. the Duke of Connaught. These include a couple of meerkets, two specimens of the Cape zorille, or muishund, as the animal is called by the Boers, a Sykes's guenon, and a Malagasy ring-tailed lemur. These animals were presented to Princess Patricia of Connaught by the Chief Lewanika.

In *British Birds* for January, Messrs. Witherby and Hartert, after referring to the distinctness of the English jay (*Garrulus glandarius rufitergum*) from the typical Con-

tinental representative of the species, announce that, in their opinion, the Irish jay is likewise entitled to rank as a local race. Compared with British specimens, the Irish jay (*G. g. hibernicus*) has the feathers of the sides of the head and ear-crests markedly darker and more rufous, while there is a tendency to a similar darkening all over the under-parts, and the crest is conspicuously darker. The Irish jay is mainly restricted to Leinster and the adjacent districts of Munster, although of late years it has spread into the south of Ulster. The Irish representatives of two other birds—the water ouzel and the coal titmouse—have recently been described as local forms. Whether we are any the forwarder for such splitting-up of species may be a question.

WE are indebted to Mr. W. H. Shrubsole for a copy of an unpublished article on the contrast between the protection accorded to useful birds in Hungary and Great Britain. The Hungarian Government employs the services of an ornithological expert, and from the results thereby attained has been enabled to draw up a series of enactments which appear admirably adapted for the protection of all species beneficial to the agriculturist. Heavy fines are enacted on the conviction of offenders against these Acts, while rewards are offered to the writers of the best essays on bird-protection. Other paragraphs in the Acts prohibit the possession or transport of scheduled birds or their nests and eggs. On the other hand, the British Acts for the protection of wild birds are, in the author's opinion, altogether inadequate. Attention is also directed to the use in Italy of huge nets—some half a mile in length and of great height—for the capture of swallows and other migratory birds.

IN the issue of NATURE of October 6 last (vol. lxxxiv., p. 428) a letter was published from Prof. T. D. A. Cockerell containing some interesting information concerning the fur trade. Prof. Cockerell gave extracts from a detailed synonymy contained in the retail catalogue of an important American firm dealing in furs, which showed how far the furs bought from shops may be identified from the names under which they are sold. A letter to the *Morning Post* of January 12, from Mr. E. M. Kirwan, raises the same point, and offers a warning to the public in the form of a list showing the proper names of the various furs and the permissible descriptions sanctioned by the Fur and Skin Section of the London Chamber of Commerce and the London Drapers' Chamber of Trade. Mr. Kirwan's list is as follows:—

Name of Fur.	Permissible Description.
American sable	Canadian sable or real sable.
Fitch dyed	Sable fitch.
Goats dyed	Bear goat.
Hare dyed	Sable hare or fox hare.
Kids	Caracul kids.
Marmot dyed	Sable marmot, mink marmot, or skunk marmot.
Mink dyed	Sable mink.
Musquash dyed	Mink musquash or sable musquash.
Musquash pulled and dyed	Seal musquash.
Nutria pulled and dyed ...	Seal nutria.
Nutria pulled, natural	Beaver nutria or otter nutria.
Opossum sheared and dyed	Beaver opossum.
Otter pulled and dyed	Seal otter.
Rabbit dyed	Sable coney.
Rabbit sheared and dyed ...	Seal coney or musquash coney.
Rabbit, white	Mock ermine.
Rabbit, white, dyed	Chinchilla coney.
Wallaby sheared and dyed	Skunk wallaby.
White hare	Imitation fox or mock fox.
White hairs inserted in foxes and sables	Pointed.

IN a recent number (December, 1910) which has reached us of the Leipzig *Neue Weltanschauung* Prof. Max Kassowitz, of Vienna, criticises the views of those biologists who consider that the main cause of the origin of species is to be found in natural selection. His objections are all tolerably familiar. He points out, for example, that the analogy from artificial selection is not complete. The breeder selects characters from motives of curiosity and the like, not because they are useful to the form dealt with, but because they are useful or interesting to himself. Moreover, in order to maintain his artificially produced race, he has to exercise a far more rigid selection than can take place in nature. When left to themselves, such strains rapidly revert. The Lamarckian explanation must be resorted to, not merely for the atrophy and disappearance of disused organs, but also for the enhanced development of frequently used parts. Evidence of this is afforded by Darwin's comparison of the wing and leg bones of tame and wild ducks. If it is once admitted, the author remarks, that the changes produced by use or disuse can pass over to the offspring by means of the germ-plasm, there is no further reason for doubting the general transmissibility of acquired characters or the influence of this principle on every change that takes place in the course of the development of species. Natural selection, he declares, has not hindered the peculiar susceptibility of mankind to certain forms of disease. In these cases the working of a Lamarckian factor can be traced, not of the nature of Darwin's pangenesis, to which there are obvious objections, but more probably a circulation of specific atom-complexes derived from the disintegration of protoplasmic molecules. Prof. Kassowitz's contentions have been heard before, and abundantly answered. Had he taken into account the results of Mendelian research, it is plain that some of them would never have been advanced. The concluding argument of his paper, on the subject of disease toxins, is ingenious, but unconvincing.

A REVIEW of the development of the Ligulatae, *i.e.* the genera *Selaginella* and *Isoetes*, communicated by Dr. G. Ritter to *Naturwissenschaftliche Wochenschrift* (December 11, 1910), traverses the investigations by Bruchmann into the various modifications of the prothalli and embryo in *Selaginella*, and describes similar stages in *Isoetes*.

THE list of seeds of hardy herbaceous plants, shrubs, and trees available for exchange with botanic gardens and regular correspondents, annually published by the director of Kew Gardens, has lately been issued in the usual form as Appendix 1 to the *Kew Bulletin*, 1911. The list is a short one, presumably reflecting the past unfavourable season, during which the gentians and cotoneasters have yielded the best results.

A SKETCH of the flora of the Samoa Islands is contributed by Dr. F. Vaupel to Engler's *Botanische Jahrbücher* (Beiblatt, No. cii.), with reference to his collections of plants gathered chiefly on the island of Savaii. The flora falls into the Melanesian division of the Malayan region while showing affinities with the floras of Australia and New Zealand. In common with other insular floras cryptogams are abundant, and the ferns supply 200 species as compared with 600 flowering plants. Two of the most typical are *Angiopteris evecta* and the small tree-fern *Todea Fraseri*; *Tmesipteris tannensis*, two species of *Psilotum*, and *Botrychium daucifolium* are reckoned among the rarer pteridophyta. A unique feature of some of the lagoons is the thick growth of *Acrostichum aureum* alongside the brackish water, and a peculiar vegetation, consist-

ing of a tangle of *Gleichenia dichotoma*, *Pteris heterophylla*, and *Imperata arundinacea* penetrated by masses of *Lycopodium cernuum*, covers the tufa soil on the plateaux. Among phanerogams, the orchids are well developed, also the dicotyledonous genera *Psychotria*, *Cyrtandra*, and *Elatostemma*.

BULLETIN 124 of the West Virginia Experiment Station deals with factors influencing the vigour of incubated chickens. Incubators operated without moisture gave rather better results than those where moisture was supplied, but the author is not prepared to assert that the difference is real. Indeed, this old controversy whether a moist or a dry atmosphere should be maintained in an incubator has not yet been satisfactorily settled. It has been suggested that the chick embryos have a certain power of adapting themselves to different degrees of humidity during their development.

THE *Bulletin de la Société d'Encouragement pour l'Industrie nationale* (No. 9) contains an interesting report, by M. Maurice Alfassa, on economic imperialism in Great Britain, in which he deals fully with the efforts now being made to promote cotton growing within the British Empire and to study the problems to which it gives rise. He advises that our African experiments should be closely watched, as some of the conditions are not dissimilar to those obtaining in the French African possessions, and considers that if it is worth our while to try to raise our own cotton it is equally worth while for France.

THE current number of the *Agricultural Journal of India* (vol. v., part iv.) is up to its usual level of interest, and contains several well-illustrated articles dealing with native agricultural practices, and with possible improvements on them. Mr. Keatinge gives a well-written account of the rural economy of the Bombay Deccan, both in its western part, where there is a moderate rainfall and a certain amount of irrigation, and where, consequently, good garden crops can be grown, and in its eastern portion, where a heavy black soil occurs, but rainfall and irrigation are both deficient; here the typical crops are *jowari* and cotton. The population naturally follows the water supply; in the western part it is not uncommon to find the cultivator living on his holding and working industriously at it; in the eastern part, however, the cultivators' houses are confined to the villages on account of the public wells, and much less work is done on the fields. A description is given in another article of the new agricultural college at Coimbatore, Madras, and Mr. Gammie reproduces the paper on cotton cultivation in India that he presented to the Brussels Congress last May.

THE monthly meteorological chart of the North Atlantic Ocean for January, issued by the *Deutsche Seewarte*, explains the good use made of radiotelegraphy for disseminating weather and storm-warning notices to vessels and small craft in the North and Baltic Seas. (1) The wireless station at Norddeich follows its time signal at 11 p.m. by a short summary received from the Seewarte of the weather conditions over Europe at 8 a.m., with forecasts for the above-mentioned localities. (2) When necessary, storm-warnings are sent to the same station, and are received by vessels having wireless apparatus and repeated by them by means of day and night signals. (3) Storm-warnings are also sent by the Seewarte to the fishery cruiser in the North Sea, and repeated by ordinary signals by day, and at night by searchlight, for the benefit of fishing-boats. (4) Storm-warnings intended only for the Baltic coast are disseminated in a similar manner by the wireless station at Bühl.

THE descent of a sphere in a viscous liquid was studied by Basset in 1887, but the equation of motion was only integrated by successive approximation. Since that time the subject has been discussed in the *Atti dei Lincei* for 1907 by Prof. Picciati and Dr. Tommaso Boggio. In the *Quarterly Journal of Pure and Applied Mathematics*, No. 164 (1910), Mr. Basset gives a general investigation of the problem, based on the work of the two Italian writers. One notable feature of the work is that the viscosity enters into the Stokes' current-function solution in a way that it did not enter in the earlier solutions of the problems.

In a paper on the imaginary in geometry, contributed to the University Studies, Lincoln, Nebraska, x., 1., Prof. Ellery W. Davis discusses geometrical properties connected with a mode of representing points in two-dimensional space the coordinates of which are both complex variables. He takes a so-called "black" point P the coordinates of which are the real parts of the variables, and from it draws a "red vector" the compounds of which are the imaginary parts, the extremity being a "blue" point P' the coordinates of which measure the real parts *plus* the imaginary coefficients.

THE *Revue scientifique* for December 31, 1910, contains the address delivered by M. H. Le Chatelier at the Collège de France on December 18 in connection with the ceremonies commemorating the centenary of the birth of Regnault. In the course of his address M. Le Chatelier referred to several facts in the early life of Regnault not generally known. An orphan without means, he spent his youth as an assistant in a fancy bazaar, and at the age of twenty-two entered as a student at the Ecole des Mines. He rose immediately to a prominent position as one of the most promising pupils, and at the qualifying examinations in May, 1834, after two years only of study, he passed brilliantly. For some strange reason the Government refused to nominate him student engineer along with his successful fellow-students, but insisted on a further two years' course at the Ecole. During this period he raised himself by his chemical researches to the front rank of chemists, and it was only on the appointment of a Government commission on the steam engine in 1843 that he commenced that series of measurements in the domain of physics which for accuracy remained unique for half a century.

IN NATURE for August, 11, 1910, we directed the attention of our readers to a communication to the Vienna Academy of Sciences, which appeared in the *Physikalische Zeitschrift* for July 15, and gave a preliminary account of the measurements of quantities of electricity less than the electron or "atom of electricity," by Dr. F. Ehrenhaft, of the University of Vienna. The complete account of the measurements is now available in the *Sitzungsberichte* of the academy for May, 1910. Since our previous note, Prof. Millikan has published in *Science* for September, 1910, an account of his measurements of the charges on drops of oil produced by an "atomiser" or sprayer. He concludes from them that the atomic charge of electricity is 4.9×10^{-10} electrostatic units. Dr. Ehrenhaft points out in his complete paper that many of Prof. Millikan's results do not fit in with his conclusion. The June (1910) number of the *Sitzungsberichte* contains Dr. K. Przibram's measurements of the charges on the fine particles of mists produced by electrolysis of a solution of potassium hydrate, by the spark discharge in moist air, by hydrochloric acid, or by phosphorus in moist air. His results confirm those of Dr. Ehrenhaft, so that there is a serious difference of opinion between the Viennese and other observers on the

fundamental question of the existence of atomic charges of electricity.

THE paper read by Major O'Meara, C.M.G., on submarine cables for long-distance telephone circuits, at the Institution of Electrical Engineers on January 12, when Mr. Herbert Samuel, the Postmaster-General, was present, will be welcomed by electrical engineers. The paper gave in the first place a brief description of the first telephone cable of notable length; and after touching shortly on the differences in subsequent cables laid across the Channel—which varied very little from the original—proceeded to describe the latest telephone cable laid last year between Dover and Cape Gris Nez. This cable was specially designed to improve the clearness of speech over the line, and also to enable more distant parts of the Continent to be in direct communication with England. To overcome the indistinctness, to which all long-distance telephone cables are liable, small induction coils are inserted in the cable. The theory of this was first propounded by Messrs. Heaviside and Pupin, and is embodied in the present "coil loaded" cable. Two double coils are required for the four conductors and are inserted at a distance of one knot (1.153 miles) apart, each coil being just under six ohms resistance. The two coils nearest the ends of the cable are only half a knot from the terminal instruments, this having been found to give the best results. It is essential, having regard to the maintenance of these cables, that the coils should be evenly distributed, as in repairing cables intermediate lengths have to be inserted. So long as the coil spacing is not altered beyond five per cent. on either side, no noticeable impairment to speech will take place. The importance of this fact will be appreciated when the list of repairs on existing telephone cables is taken into account. It was doubtful when the cable was designed as to how the mechanical difficulty of securing the coils in the cable would be overcome, owing to the increase of size at the points where the coils are inserted, and also the difficulty of the increased thicknesses passing over the drums when laying the cable. These difficulties were successfully overcome and a special paying-out drum was employed, the cable being paid out without passing it under the dynamometer wheel. The paper gives a full description of the laying of the cable; and the complete specification of the cable is contained in one of the many appendices attached thereto. Under the previous existing conditions, conversation could be carried on over a distance of 250 miles, but with the new "coil-loaded" cable a distance of 850 miles is possible.

THE current number (January 10) of the *Comptes rendus* of the Paris Academy contains an account of a new general method of preparing anhydrous metallic chlorides, by Ed. Chauvenet. The method recently proposed by Matignon and Bourion, based on the use of a mixture of chlorine and sulphur chloride, is efficient, but the method now proposed is simpler in that phosgene is used, a substance commercially obtainable in the liquid form in bombs. The oxide of the metal is placed in a boat, and heated in a slow stream of the carbonyl chloride; the metallic chloride, if it is volatile, sublimes a little in advance of the boat in crystals, the temperature required varying between 350° C. and 650° C. Of the numerous oxides tried only silica was unacted upon, a fact which will be of service in separating silica from other metallic oxides, such as the oxides of tungsten, tantalum, or titanium. Titanium and tungsten furnished oxychlorides, but in all the other cases examined the pure anhydrous chloride was obtained.

At the students' meeting of the Institution of Civil Engineers, held on January 6, Mr. G. F. Davidson read a

paper entitled "The Measurement of Boiler Deformations." The author described a novel and ingenious method of ascertaining the deformation and corresponding stress by means of a mirror attached to the point on the shell to be examined and a telescope sighted on to the mirror, the reflected reading of a graduated scale being observed and the angular deflection thereby ascertained.

WE learn from a note in the *Builder* for January 13 that M. Knauth, in reporting on the settlement in Strassburg Cathedral, states that the chief cause is the defective condition of the foundations beneath the north tower. The foundations consist of two walls running north to south and east to west, and are constructed of rubble and cement on argillaceous soil, in which some timber piles had been driven. The piles are badly decayed, and the interior pillar of the tower is said to be virtually unsupported for a length of 2 metres, as a layer of vegetable earth is interposed between the foundations and the base of the pillar. Like many fabrics of the same class in this and other countries, Strassburg Cathedral was built in different epochs, one result being that the foundations have now to carry loads greater than those contemplated by the original designer. This point is illustrated by the statement that the present foundation load is upwards of 25 tons per square foot. The remedy proposed is the underpinning of all defective foundations.

A BLUE-BOOK has just been issued giving account of the engine trials at the National Physical Laboratory for the award of the prize of 1000*l.* offered by Mr. Patrick Y. Alexander. These trials form the subject of an article in *Engineering* for January 13, from which we gather that six engines were entered, but only three arrived before the date fixed. These were:—(1) the Wolseley Tool and Motor-car Company, Birmingham; (2) Messrs. Humber; and (3) the Aster Engineering Company, Wembley Park (entered by Green's Motor Patents Syndicate). Not one of these engines was able to fulfil the conditions of the test fully. The first was pulled up by a leak in the copper oil pipe leading from the pump to the oil well, a defect which led to other mishaps. The Humber motor ran steadily at 37 brake-horse-power at 1224 revolutions per minute for 11½ hours, and then stopped suddenly with one of the cylinders broken off and two connecting rods buckled. The Green engine was more fortunate. It had to stop for a new sparking plug, and then ran, making approximately 31·5 brake-horse-power at 1213 revolutions per minute, until the completion of the twenty-four hours' run. In a special test of seven minutes, the motor developed 36·4 brake-horse-power at 1390 revolutions per minute. The prize has not been awarded, but we understand that the donor has generously presented a cheque for 200*l.* to the makers of the Green engine, which came nearest to the conditions of award.

MESSRS. J. AND A. CHURCHILL have just ready for publication a new edition of another volume of "Allen's Commercial Organic Analysis." It is vol. iv. under the new arrangement, and has been rewritten under the editorship of Mr. W. A. Davis and Mr. S. S. Sadtler.

MESSRS. WILLIAMS AND NORGATE announce for early publication a translation into English of Prof. Wilhelm Ostwald's work entitled "Natural Philosophy." This work, the translation of which will be revised by the author, gives a *résumé* of modern natural philosophy, based not upon metaphysics, but upon the sciences; and it aims at providing a complete synthesis of the results of the specialisation of last century.

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OUR ASTRONOMICAL COLUMN.

NOVA LACERTÆ.—A brief note in No. 4464 of the *Astronomische Nachrichten* announces that Prof. Max Wolf has found a twelfth- or thirteenth-magnitude star in the position of Nova Lacertæ on plates taken some years ago at the Königstuhl Observatory. The previous presence of a faint object does not, of course, necessarily preclude the star discovered by Mr. Espin from being of the "novæ" type, although in most cases the pre-existence of matter in the identical position is assumed rather than demonstrated; before the catastrophe which produces the extraordinary outburst of light, the object is usually too faint to be detected on our photographs.

More precise spectrum observations than those yet published will permit us to determine whether the outburst was of the catastrophic nature which produces typical "novæ" or whether it is simply a case of a peculiar variable; up to the present, the unfavourable English skies, combined with the faintness or the object, have prevented definitive observations. Seven or eight bright lines have been observed at the Cambridge Observatory, and it is worthy of note that they have not the broad appearance of lines seen in the spectra of novæ.

It is to be regretted that the "nova" was not discovered earlier, for we understand that Prof. Pickering has found images of it, on plates taken about the end of November, 1910, showing it to be of approximately the same photographic magnitude (about 5·0) as the star 9 Lacertæ shown on the chart which we gave in last week's issue; on December 30, 1910, its magnitude was about 7·0. Referring to these facts, at the Newcastle Astronomical Society, Mr. Espin pointed out that for some three weeks the star was visible to the naked eye, yet no one observed it. It was not visible on the Harvard plates on November 19, so that its rise to the fifth magnitude must have been rapid. Mr. Espin suggests that these observations conclusively prove the object to be a real nova. A plate taken at Harvard in December, 1887, although it shows faint stars, shows no trace of the nova.

Mr. Bellamy estimated the visual magnitude on January 2 as 7·5, and recorded the colour as orange. It will probably be found, as with other novæ, that there is a certain difference between the photographic and visual magnitudes, due to the presence of radiations visually inert, and this is suggested by the fact, stated by the Astronomer Royal, that the photographs taken at Greenwich show the image of the nova to be different in appearance from the other star images shown on the same plates.

THE ORBITS OF SEVERAL SPECTROSCOPIC BINARIES.—Nos. 5-8, vol. ii., of the Publications of the Allegheny Observatory contain the discussions of the orbits of various spectroscopic binaries under investigation at the observatory.

In No. 5 Mr. R. H. Baker discusses the measures of the spectrum of 30 H. Ursæ Majoris as shown on fifty plates taken with the Mellon spectrograph in 1908-10. He finds that the observations are not so well satisfied by the preliminary curve computed on the assumption of simple elliptic motion, but the agreement is improved by the introduction of a secondary oscillation. As there is no trace of the secondary component on any of the plates, the resulting orbit must be accepted as preliminary; the period is 11·5832 days.

Thirty spectrograms of 57 Cygni are discussed by the same observer in No. 6 of the Publications. These were taken in 1909, and a comparison of the results with earlier ones secured in 1903 establishes the period as 2·8546 days. The orbits of both primary and secondary components are given separately and then combined, and it appears that the masses are not very different.

Mr. Baker also reverts to the discussion of θ Aquilæ, in No. 7, which, from a comparison of observations made by M. Deslandres in 1901-2 with later ones made in 1907-8 by Mr. Baker, appeared to have a variable period. The latter observer now finds that the two observations of 1901 are probably erroneous, and that the period of θ Aquilæ (17·1245 days) is constant. The orbit as published is derived from single-prism plates, where the lines are confused, and can be only an approximation to the true elements; the star is bright enough, however, for